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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/328,391 06/09/99 BERGER

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022850 MM91/1016
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EXAMINER

BROCK II, P

ART UNIT

PAPER NUMBER

2815

DATE MAILED:

10/16/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/328,391

Applicant(s)

BERGER ET AL.

Examiner

Paul E Brock II

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) 4, 5 and 7-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6, 11 and 12 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 June 1999 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5, 7 and 9.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Species IA in Paper No. 11 is acknowledged. The traversal is on the ground(s) that "no undue burden has been established if each of the claims were examined together". This is not found persuasive because if the applicant has not stated on the record that each individual species are obvious variants of each other or clearly that this is the case. If the applicant makes a statement on the record that the species are obvious variants of each other than the restriction requirement will be withdrawn.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 4, 5 and 7 – 10 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected Species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 11.

Drawings

3. Figures 1a and 1b should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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5. Claims 1 and 2 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With regard to claim 1, it is not clear if "those" are referring to the lower conduction band of the quantum well and the electron storage layers or both the lower and upper conduction bands of these layers.

With regard to claim 2, it is not clear if "their" is referring to the first and third barrier layers, or the entire stack of layers made of III-V semiconductor materials.

With regard to claim 3, it is not clear how the term "up to" further defines the claim.

6. Claim 1 recites the limitation "the conduction band profile" in the second line of the claim. Further, claim 1 recites the limitation "the absorption" in the fifth line of the claim. Still further, claim 1 recites the limitation "the reading" in the sixth line of the claim. And still, claim 1 recites the limitation "the thickness" of the transfer barrier layer and the quantum well layer in the ninth line and tenth lines of the claim, respectively. There is insufficient antecedent basis for these limitations in the claim.

7. Claim 6 recites the limitation "the plane" in the fourth line of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1, 2, 3 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rosencher et al. (USPAT 5086327, Rosencher) in view of Katoh (USPAT 5041882).

Rosencher discloses in figure 3 an electromagnetic wave detector. Rosencher discloses in figure 3 a stack of layers made of III-V semiconductor materials. Rosencher discloses in figure 3 a conduction band profile of the materials defining at least one quantum well (3), the quantum well having at least one first discrete energy level populated with electrons that are capable of passing to a second energy level under absorption of an electromagnetic wave. Rosencher discloses in figure 3 means for reading the electrons in the second energy level wherein the stack of layers of semiconductor materials furthermore comprises an electron storage layer (5) separated from the quantum well by a transfer barrier layer (4). Rosencher discloses in figure 3 that the lower energy level of the conduction band of the transfer barrier layer being greater than the lower energy levels of the quantum well and the electron storage layers. Rosencher discloses in figure 4 that of a thickness of the transfer barrier layer is about one order of magnitude greater than a thickness of the quantum well. Rosencher does not disclose that the lower energy level of the conduction band of the transfer barrier layer decreases from the quantum well to the electron storage layer. Katoh teaches in column 3, lines 37 – 48 a lower energy level of a conduction band of a transfer barrier layer that decreases from a quantum well

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to an electron storage layer so as to further the flow of electrons from a second energy state to the electron storage layer. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the transfer barrier layer with a decreasing lower energy level of its conduction band of Katoh in the method of Rosencher in order to establish an electron accelerating electric field within the barrier layer as stated by Katoh in column 3, lines 37 – 48.

With regard to claim 2, Rosencher discloses in figure 3 wherein the stack of layers made of III-V semiconductor materials furthermore comprises a first barrier layer (2) and a third barrier layer (6) made of semiconductor materials such that the lower energy level of the conduction band of the first and third barrier layers are respectively greater than the lower energy levels of the conduction band of the quantum well and of the electron storage layer.

With regard to claim 3, Katoh discloses in column 3, lines 37 – 48 wherein the decreasing profile of the lower energy level of the conduction band of the transfer barrier layer is obtained with a semiconductor alloy whose composition varies from the quantum well to the electron storage layer.

With regard to claim 11, Rosencher teaches in the abstract that that the electromagnetic wave detector comprises means to reset the flow of the electrons in the storage layer.

10. Claims 6 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rosencher and Katoh as applied to claim 1 above, and further in view of Nanbu (JPPAT 361054673).

With regard to claim 6, Rosencher and Katoh do not teach that first and second ohmic contacts are located at the electron storage layer. Nanbu discloses in the Constitution section and

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figure 1 a first (4) and second (5) ohmic contacts that are located at an electron storage layer (10) so as to carry out a measurement of photocurrent in the plane of the storage layer. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the ohmic contacts of Nanbu in the device of Rosencher and Katoh in order to stably realize electron mobility as stated by Nanbu in the abstract portion of the English translation.

With regard to claim 12, Nanbu discloses in figure 1 that the third and fourth contacts are located on either side of a stack of layers of semiconductor materials.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Dumke et al., Matsuno et al., Allyn et al., Zhou et al. and Amamiya disclose a graded barrier layer. Devaud-Pledran et al. discloses an electromagnetic detector. Agawa et al. disclose ohmic contacts contacting an electron storage layer.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul E Brock II whose telephone number is (703)308-6236. The examiner can normally be reached on 8:30 AM-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703)308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-7722 for regular communications and (703)308-7722 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Paul E Brock II
October 10, 2001

A handwritten signature in black ink, appearing to be 'PEB' with a stylized flourish at the end.A handwritten signature in black ink, appearing to be 'Eddie Lee' with a large, sweeping initial 'E'.

EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800